

Notes on the Giant Frog, *Rana macrodon*

By N. SMEDLEY, M. A.

Two varieties of the frog, *Rana macrodon*, have been generally recognised. The typical form was first obtained in Java and named by Kuhl; a description was given by Dumeril and Bibron (1) in 1841. Günther's description (2) applies to this form.

In 1855 Blyth (3) described a new species from Tenasserim, *Rana fusca* (preoccupied) which Boulenger (15) has included under his var. *blythii*. As this is, in effect, a new name for *R. fusca* the type-locality may be taken as Tenasserim. Blyth's very inadequate description has been amplified by Anderson (4) and Stoliczka (5).

Dealing with specimens from Singapore, Blanford (6) says they are broader in the head than *R. fusca* and mentions broad-headed specimens from Java, in the British Museum. *R. fusca* of Blyth is placed by Boulenger (7 and 8) in the synonymy of *R. macrodon*.

Flower (9) distinguishes between the broad-headed Singapore and narrow-headed Penang varieties. He appears to regard the narrow-headed form as a northern variety and (10) comments on the fact that it is found as far south as Johore. Reference is also made to a 9 inch specimen taken by Butler in Kuala Lumpur, but neither Flower nor Butler (11) state to which form this specimen belongs; the latter speaks of "9 inch monsters from jungle-pools in the low country." Another large specimen, 9½ inches in length, was taken by A. D. Machado at Selinsing, near Bentong, Pahang in 1899 as recorded by Hanitsch (12). It is of the broad-headed variety and is evidently the specimen erroneously referred to Singapore by Boulenger (13). This author, in his work on the Peninsular fauna (14), evinces a determination to make the facts fit his preconceived theory of a northern and southern form

by his reference to "the larger variety found in Singapore," and a disregard of equally large specimens found farther north. In this he has been followed by Smith, who states (19) that "All specimens of *R. macradon* from the northern part of the Peninsula differ from those found in the south in having a narrower head, larger eye, and longer hind-limbs." He had previously, in referring specimens from Pahang to var. *blythii*, noted that the tibio-tarsal articulation in the adults did not reach the tip of the snout.

I have examined a long series of specimens in the collection of the Raffles Museum, and the following conclusions are based on measurements of these specimens omitting immature frogs, and those in unsatisfactory condition or of dubious provenance.

The species probably gave rise at an early stage to two forms.

(A). The typical form, which is very stable, is of heavy build, head broad and flat, snout rounded, loreal region deep and very oblique.

So far as is known this form alone occurs in Java, but has spread throughout the lowlands of the western part of the Archipelago for it has been noted from Borneo, the Malay Peninsula and at least one of the islands off the west of Sumatra. It may therefore be expected from Sumatra unless it has become extinct there. So far as Malaya is concerned it is not confined to Singapore, but has been found in Johore and Pahang in localities not far from those occupied by the other form, in Malacca and in Selangor. It is this form which grows to the large size of over nine inches.

(B). The second variety has a narrower head, pointed snout, more vertical and shallower loreal region. It is very mutable, which probably accounts for its success: it is by far the commoner. With the exception of Java, where it appears to be absent, it exists side by side with the typical form wherever the latter is found, and is also recorded from Sumatra and the Philippines, but it is not confined to the lowlands. It tends to split up into recognisable local forms where segregated. Both forms occurs throughout the western part of the Archipelago, but probably eastern records are erroneous (17).

The tables show total length: length and breadth of head; the relation $\frac{\text{Total length}}{\text{Head breadth}}$, as this gives a good basis of separation

of the two main forms (young specimens of the typical form however have a narrower head); relation of tibio-tarsal articulation to tip of snout (0 = reaches, + = surpasses, - = short of, tip).

NOTES ON THE GIANT FROG (*RANA MACRODON*)

Locality	Total Length	HEAD		Total Length	Tibio-tarsal articulation
		Length	Breadth	Head Breadth	
1. Silencing, Pahang ..	110	44	57	2.08	—
2. do. ...	220*	81	95	2.33	—
3. Lubok Tamang, Pahang ...	70	28	28	2.82	+
4. do. ...	95	37	36	2.64	+
5. Malacca ...	92	35	40	2.30	—
6. Penang ...	100	44	43	2.54	—
7. do. ...	93	42	43	2.16	—
8. do. ...	84	37	37	2.27	—
9. Maxwell's Hill, Perak ...	100	40	43	2.33	—
10. do. ...	78	27	27	2.86	—
11. do. ...	76	28	27	2.82	—
12. do. ...	80	30	31.5	2.83	—
13. do. ...	75	26	26	2.66	—
14. do. ...	91	32	34	2.68	—
15. do. ...	86	29	29	2.96	—
16. do. ...	87	29	31	2.81	—
17. do. ...	89	34	34	2.62	—
18. do. ...	84	31	31	2.71	+
19. Gunong Kledang, Perak ...	78	27.5	27.5	2.84	—
20. Pelelah Valley, Johore ...	90	31	31	2.0	+
21. do. ...	103	38	37	2.78	—
22. do. ...	102	35	35	2.01	—
23. do. ...	134	48	50	2.68	—
24. do. ...	145	56	56	2.50	—
25. do. ...	121	44	45	2.69	—
26. do. ...	98	37	38	2.58	—
27. Kota Tinggi, Johore ...	101	35	43	2.35	—
28. do. ...	69	25	25	2.76	+
29. do. ...	104	38	43	2.42	+
30. do. ...	64	24	25	2.56	+
31. ? Singapore, or Johore ...	210	86	100	2.1	—
32. Singapore ...	148	61	73	2.03	—
33. Bukit Timah, Singapore ...	68	25	28	2.43	—
34. do. ...	80	29	29	2.77	—
35. Sedagong, Tioman Id. ...	125	47	47	2.66	—
36. do. ...	80	32	32	2.78	—
37. Siberut Id. ...	90	34	38	2.34	—
38. do. ...	105	33	35	3.00	—
39. do. ...	81	30	30	2.70	—
40. do. ...	90	32	34	2.65	—
41. do. ...	91	31	31	2.87	—
42. do. ...	98	30	30	2.51	—
43. do. ...	84	32	32	2.63	—
44. do. ...	92	34	37	2.40	—
45. Baram, Borneo ...	80	28	30	2.67	—
46. Bettotan, B. N. Borneo ...	90	32	33	2.73	—
47. do. ...	60	30	32	2.81	—
48. Kinn Balu ...	68	24	24	2.83	—

*235 when fresh

The following are analyses of specimens from various localities:—

Perak (*Maxwell's Hill and Gunung Kiedang*). Belongs to (B) but snout broadens slightly with age. Hind limb usually shorter than, but in some cases equals and in one specimen surpasses snout.

Pahang. (*Silensing*) (A).

Pahang. (*Lubok Tamang*) (B). Narrow head, long legs.

Perang. (B), with rather large head.

Malacca. (A).

Johore. (*Kota Tinggi*) (A).

Johore. (*Pelepah Valley*) (B). Narrow head, legs long where measured.

Singapore. (A and B).

Siberut, Mentawi Ids. Head as broad as long or slightly broader, but narrow compared with length of body; legs short.

<i>Borneo</i> .	<table border="0"> <tr> <td><i>Kina Balu</i></td> <td rowspan="3">} Head as broad as long or broader: legs medium.</td> </tr> <tr> <td><i>Baram</i></td> </tr> <tr> <td><i>Bettotan</i></td> </tr> </table>	<i>Kina Balu</i>	} Head as broad as long or broader: legs medium.	<i>Baram</i>	<i>Bettotan</i>
<i>Kina Balu</i>	} Head as broad as long or broader: legs medium.				
<i>Baram</i>					
<i>Bettotan</i>					

The variety *leporina* of Andersson (18), type locality Tumbang Maroewei, Central Borneo, is not represented in the collection of the Raffles Museum, but appears from the description to be of the same order as the above minor forms.

A list of the most important references is appended.

REFERENCES

1. Dumeril et Bibron., *Érp. Gén.* VIII, 1841, p. 382.
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10. Flower, *P. Z. S.*, 1899, pp. 888 and 916, pl. lix, fig. 1.
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12. Hanitsch, *Guide to the Zoological Collections of the Raffles Museum*, 1908, p. 47.
13. van Kampen, *Nat. Tijdschr. Ned. Ind.* LXIX, 1909, p. 32.
14. Boulenger, *Fauna Mal. Pen.*, Rept., 1912, p. 233.
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18. Andersson, *Medd. fra det Zool. Mus. Krist.*, p. 124.
19. Smith, *Bull. Raffles Mus.*, 3, 1930, p. 98.